



MISSISSIPPI STATE  
UNIVERSITY  
EXTENSION SERVICE



## Forage Production Newsletter

August 10, 2010

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## Factors Affecting Hay Quality And The Bottom Line



Hay production is definitely a necessary evil and is one of the most costly measures in a cattle operation when you consider the price of the equipment, fertilizer, pesticides and labor but it can be even more expensive when you consider the impacts of feeding low quality hay to cattle. Granted, most growers do not know what the quality of their hay is and they just assume that it will beat a snow-ball. The feeding of high quality hay can actually reduce the number of trips to the local feed store and save a large sum of money over time. Producing high quality hay may not be as expensive as most people think when we look at the big picture. Many costs incurred in hay production may actually carry over to other segments of the forage system or systems.

There are many items that must be addressed in producing an abundance of high quality hay and they include the following.

1. *Weeds and Insects:* With the chemistries today there is no reason not to control these pests. Weeds rob us of our moisture and nutrients reducing our quantity of production but can also prevent us from putting up high quality hay. The presence of weeds in our hay can increase moisture and prevent adequate curing. Weeds also place in the hay foreign matter that does not contribute to the nutritive value of the hay. We have many new herbicides in our arsenal today that are very effective against many weed species and also provide us with residual activity. Fall armyworms are also a pest in our hay fields that can deprive us of adequate levels of hay production. These pests can be controlled easily and the control measures are very affordable than what has traditionally been used.

2. *Environmental conditions:* Environmental conditions can greatly impact hay quality. Everyone knows that rain on cut hay can negatively impact quality. However, environmental conditions prior to cutting can also affect quality. During periods of high rainfall coupled with high temperatures can result in low quality due to rapid growth that speeds maturity. In these conditions the plant might become over-mature and lose quality. Under adequate rainfall and lower temperatures the plant will not progress as rapidly and will maintain higher quality

3. *Fertility:*

- a. Soil pH and fertility can greatly enhance hay quality and quantity.
- b. Hay cutting removes nutrients and they are not recycled as in a grazing situation. Therefore, they should be replenished after each cutting or definitely the following year depending on the nutrient. The following chart shows the amount of each nutrient removed.

Nutrient Removal In Hay			
Lbs/Ton of Hay			
Nutrient	Hybrid Bermuda	Bahiagrass	Dallisgrass
N	46	43	45
P2O5	12	12	12
K2O	50	35	50
S	6	6	6

- c. Nutrients that are important for hay production include Nitrogen, Phosphorous and Potassium. Sulfur is also very important in that it helps the plant better assimilate and use Nitrogen. Many growers in this area use a great amount of chicken litter which supplies adequate amounts of Phosphorous and Potassium but the Nitrogen in this form of fertilizer is often too slow in its use by the plant to speed growth between harvests. Therefore, I generally recommend a form of synthetic Nitrogen at lower rates to enhance plant growth between cuttings.
4. *Stage of growth affects quality:* One of our biggest problems with hay quality involves the intervals between harvests. If we can narrow the intervals our yield will decline somewhat but our quality will generally increase. The loss of yield per cutting can be overcome by hopefully gaining an extra cutting in this area.
- a. Coastal Bermudagrass increases digestible protein when grown for four weeks than for eight weeks between harvests. Therefore, Bermuda should be harvested at four weeks between cuttings. With Sumrall 007 hybrid bermudagrass we have reduced stem amount and improved curing by reducing our cutting intervals to 21-28 days between cuttings. I know this might be difficult to with our weather patterns.
  - b. Bahiagrass and Dallasgrass should be cut every four weeks or at boot or early heading stage.

*Changes in quality based on stages of maturity*

Grasses	Composition		Quality
	Leaves	Crude Protein	Neutral Detergent Fiber
-----% Dry Matter-----			
Vegetative	>50	> 18	<55
Boot	40-50	13-18	55-60
Head	30-40	8-12	61-55
Mature	20-30	<8	>65

*Changes in digestibility and energy levels of hay at four maturity stages*

Maturity Stage	Digestibility	Gross Energy	Digestible Energy	Net Energy
-----% DM-----		Mcal/lb		
Vegetative	67	1.92	1.28	0.73
Boot	61	1.90	1.16	0.65
Head	51	1.92	0.98	0.49
Senescence	47	1.93	0.91	0.41

As the charts show, when the plant matures the % dry matter and crude protein drops while the % neutral detergent fiber increases. The charts also show that digestibility and energy drop as the forage matures. This further indicates a reduction in hay quality and an increase in the content of lignin or non-digestible and a non-palatable product.

5. *Time of year can affect quality.* Generally, our earlier cuttings are higher in quality than our later harvests. The last cutting generally goes down in quality due to the weather conditions the grass is grown under. During our summer temperatures and low moisture content we tend to see a higher content of lignin and stem build up in our grass species which makes them tougher and lower in quality. Therefore time of year can have a big impact on the quality of our hay. This is not totally bad if we can shorten our intervals between the harvests.
6. *Plant Parts:*
  - a. Leaves contain more good carbohydrates and proteins that are more digestible than the stems.
  - b. As a plant matures stem materials increase and reduces the hay quality.
  - c. Therefore, timely harvest increases leaf content and quality.
7. *Proper hay curing.* Forage quality can be reduced during the curing phase due to respiration, weather and the physical loss of leaves. To minimize curing time do the following:
  - a. Use a mower conditioner.
  - b. Use a tedder.
8. *Poor storage can reduce quality.*
  - a. High moisture at storage can produce mold caused by organisms that increase heat that increases respiration and further breakdown.
  - b. Mold and heat tend to reduce consumption, reduces protein, dry matter and digestibility. It can also make animals sick and in molded hay in horses can cause them to colic.
  - c. Storing hay out of the elements can increase the longevity and quality of hay vs. hay stored in the elements.
9. *The traditional criteria for high quality hay among most growers include the following items:*
  - a. Hay must be green.
  - b. No mold and free of weeds.
  - c. Low stem content with high amounts of leaf.
  - d. Hay can't be rained on.

Granted these items are indicative of high quality hay but does not tell one much about the nutrition levels within the hay. The only way to tell what quality hay possesses is to have it sampled. This removes the guess work and allows professionals in animal nutrition tailor-make rations suitable for your hay quality. Hay can be sampled via the LSU AgCenter for a very reasonable fee. Contact your local Extension Office and get your hay sampled it will be the best money you spend.

10. *Definitions in forage Samples:*

- a. Dry Matter (DM): % of forage that is not water.
- b. Crude Protein (CP): Total amount of Nitrogen. It is further calculated as % Nitrogen X 6.25=Crude Protein. CP is a mixture of true protein and non-protein Nitrogen. Indicates the ability of the hay to meet an animals protein needs.
- c. Total Digestible Nutrient (TDN): This is the sum of all digestible organic nutrients (protein + energy).
- d. Acid Detergent Fiber: % of highly indigestible plant material in hay. The desired level for this category should be low.

Neutral Detergent Fiber: % of cell wall material in forage. This is an indicator of forage maturity and relates to intake. Lower NDF indicates greater forage intake and higher quality.

# **Private Applicators Training**

Covington County Multi Purpose Building  
68 Collins Industrial Park Drive

Collins, MS



**Thursday, August 26, 2010**

**5:30 p.m.**

**An Exam Fee of \$10 is now being charged for this certification.**

Pre-registration is requested by calling

**MSU Extension Service – Covington County 601 765 8252**